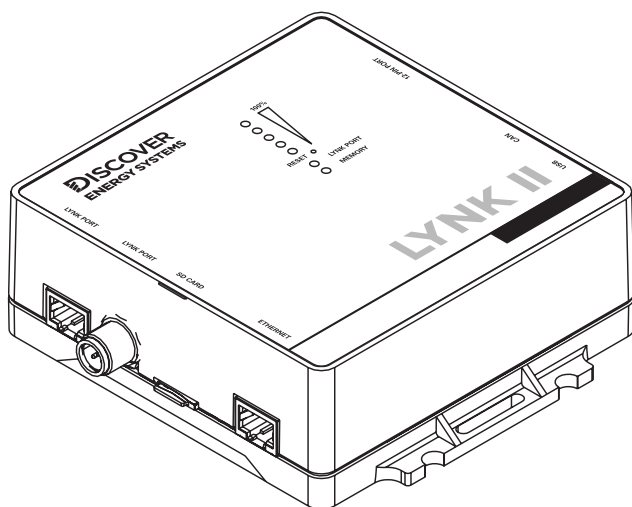




LYNK II

(950-0025)

LUXPOWER MANUAL

READ AND SAVE THESE INSTRUCTIONS

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INTRODUCTION

This Application Note provides information about integrating LYNK and AEBus network-enabled Discover Lithium Batteries using the LYNK II Communication Gateway with Luxpower power conversion devices.

1. AUDIENCE, WARNINGS, MESSAGES, GENERAL SAFETY, PERSONAL PROTECTIVE EQUIPMENT

1.1 Audience

Configuration, installations, service, and operating tasks should only be performed by qualified personnel in consultation with local authorities having jurisdiction and authorized dealers. Qualified personnel should have training, knowledge, and experience in the:

- Installation of electrical equipment
- Application of electrical codes, safety, and installation standards
- Analysis and reduction of hazards involved in performing electrical work
- Installation and configuration of batteries
- Installation and configuration of systems activated by relays

1.2 Warning, Caution, Notice, and Note Messages

Messages in this manual are formatted according to this structure.



Additional information concerning important procedures and features of the product. Read all the instructions before installation, operation, and maintenance.



Important information regarding hazardous conditions.

WARNING

Important information regarding hazardous conditions that may result in personal injury or death.

CAUTION

Important information regarding hazardous conditions that may result in personal injury.

NOTICE

Important information regarding conditions that may damage the equipment but not result in personal injury.

NOTE

Ad hoc information concerning important procedures and features unrelated to personal injury or equipment damage.

1.3 General Warnings

WARNING

ELECTRIC SHOCK AND FIRE HAZARD

- This equipment must only be installed as specified.
- Do not disassemble or modify the battery.
- If the battery case has been damaged, do not touch exposed contents.
- There are no user-serviceable parts inside.

Failure to follow these instructions may result in death or serious injury.

WARNING

ELECTRIC SHOCK AND FIRE HAZARD

Do not lay tools or other metal parts on the battery or across the terminals.

Failure to follow these instructions may result in death or serious injury.

CAUTION

ELECTRIC SHOCK

- Do not touch the energized surfaces of any electrical component in the battery system.
- Before servicing the battery, follow all procedures to fully de-energize the battery system.
- Follow the “Safe Handling Procedures” below when working with the battery.

Failure to follow these instructions may result in injury.

1.4 Safe Handling Procedures

Before using the battery and any power electronics, read all instructions and cautionary markings on all components and appropriate sections of their manuals.

- Use personal protective equipment when working with batteries.
- Do not dispose of the battery in a fire.
- Promptly dispose of or recycle used batteries following local regulations.
- Do not disassemble, open, crush, bend, deform, puncture, or shred.
- Do not modify, re-manufacture, or attempt to insert foreign objects into the battery, immerse or expose the battery to water or other liquids, fire, explosion, or other hazards. If the user suspects damage to the battery module due to water, heat, or other reason, take it to a service center for inspection.
- Only use the battery for the system for which it is specified.
- Do not lift or carry the battery while in operation.
- When lifting a heavy battery, follow the appropriate standards.
- Only lift, move, or mount following local regulations.
- Take care when handling battery terminals and cabling.
- Only use the battery with a charging system that meets specifications. Using a battery or charger that does not meet specifications may present a risk of fire, explosion, leakage, or other hazards.

- Do not short-circuit a battery or allow metallic conductive objects to contact battery terminals.
- Replace the battery only with another battery that has been qualified for the system. Using an unqualified battery may present a risk of fire, explosion, leakage, or other hazards.
- Do not drop the device or battery. If the device or battery is dropped, especially on a hard surface, and the user suspects damage, take it to a service center for inspection.

1.5 Personal Protective Equipment

When handling or working near a battery:

- Use Personal Protective Equipment, including clothing, glasses, insulated gloves, and boots.
- Do not wear rings, watches, bracelets, or necklaces.

2. DOCUMENTATION

This Application Note provides information about integrating LYNK and AEBus network-enabled Discover Lithium Batteries using the LYNK II Communication Gateway with Luxpower power conversion devices in a closed-loop configuration.

Before installation and configuration, consult the relevant product documentation, including Manuals, Application Notes, Installation and Configuration Guides.

Luxpower Documentation

- ECO HYBRID INVERTER - SNA-US 6000W WP USER MANUAL
- HYBRID INVERTER 8-10K US USER MANUAL
- HYBRID INVERTER 12K US USER MANUAL

Visit <https://luxpowertek.com/download> for the most recent version of published documents.

Discover Energy Systems Documentation

- [AES RACKMOUNT Installation and Operation Manual](#) (805-0043)
- [AES RACKMOUNT datasheet](#) (808-0039)
- [LYNK II Installation and Operation Manual](#) (805-0033)

Visit <https://www.discoverlithium.com> for the most recent version of published documents.

3. OVERVIEW

This manual provides general settings and is not a comprehensive guide to the programming and configuration of a specific installation. An installation may have unique conditions or use cases that require modification or adaptations of values. Installers must be capable of reviewing and adapting to the specifics of an installation and its specific use case and optimizing settings where needed.

The key steps required to install and configure the LYNK II Communication Gateway with compatible Discover Lithium batteries and power conversion equipment are as follows:

- Review and confirm equipment compatibility and correct sizing.
- Configure the LYNK II CAN out pins to match the CAN in pins of the power conversion equipment.
- Mount the LYNK II, connect the Discover battery communication network to either the LYNK Port or AEBus Port, and then connect the LYNK II's CAN Out Port to the power conversion equipment's communication network.
- Terminate all networks correctly.
- Using LYNK ACCESS software, set the LYNK II to the correct protocol to enable closed-loop communication between the Discover batteries and the power conversion equipment.
- Set up the closed-loop configuration parameters on the power conversion equipment.
- Set up user preferences and enable the use case using the power conversion control system.

3.1 System Overview

The LYNK II Communication Gateway unlocks the full potential of a Discover Lithium battery by enabling the internal Battery Management System (BMS) to provide other devices with real-time data in a closed-loop configuration. In solar applications, this allows the world's best hybrid inverters and solar charge controller systems to optimize their control over the charging process. LYNK II also enables the remote monitoring of Discover Lithium battery SOC and data logging of multiple sites using the data monitoring services offered by off-grid inverter systems.

Discover Lithium batteries must be set up to work with power conversion and monitoring devices in either an open-loop or closed-loop configuration. Discover Lithium battery charge and discharge settings in an open-loop configuration are set up manually through the controller for the power conversion device at installation time. Refer to [A.1 Luxpower Open-Loop Configuration](#).

In a closed-loop configuration, the BMS of the Discover Lithium battery sends the battery status over a network data connection with the power conversion device. Power conversion devices use the Discover Lithium battery BMS data to fine tune the output of their charger and deliver other functional controls based on battery voltage, temperature, and percent State-of-Charge.

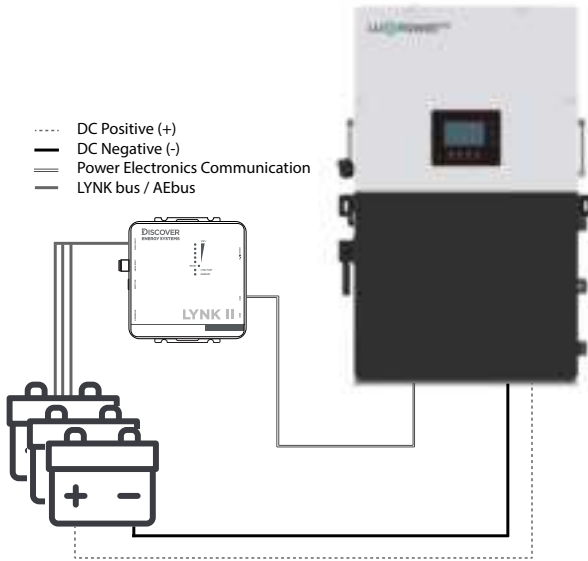


Figure 1. System Overview

3.2 Compatibility

Discover Lithium Batteries

A Discover battery must have a compatible network port, such as a LYNK Port or AEBus Port, for communicating with a LYNK II device.

- AES RACKMOUNT: 48-48-5120, 48-48-5120-H

Luxpower Inverters

The LYNK II Communication Gateway is compatible with the following Luxpower devices:

- LXP-LB-US 8K Hybrid
- LXP-LB-US 10K Hybrid
- LXP-LB-US 12K Hybrid
- SNA-US 6000 ECO Hybrid

3.3 Minimum Battery System Capacity

The Discover Lithium Battery and Luxpower device automatically manage the battery charge and discharge rates. Using large solar arrays with battery banks that are too small can exceed the operating limits of the battery to charge and possibly lead to the BMS triggering over-current protection. Battery capacity must accept the maximum charge current of the system, or charging must be curtailed below the operating limit of the installed batteries. Derive this value by adding together the charge capacities of all inverters and solar charge controllers in the system. Additionally, battery peak capacity must support the surge requirements demanded by the load attached to the inverter. Match all inverter peak power values with the sum of all battery peak current values.

$$\text{Inverter Peak} = (\text{Inverter Surge Value}) / (\text{Inverter Efficiency}) / (48\text{V: Low Battery Cut-Off})$$

Models	Inverter Peak (10 seconds)	Max Continuous Charge	Max Continuous Discharge	AES RACKMOUNT 48-48-5120/ 48-48-5120-H Minimum per inverter ⁽⁴⁾
SNA-US 6000 ECO Hybrid	269 A ⁽¹⁾	140 A	140 A	2
LXP-LB-US 8K Hybrid	351 A ⁽²⁾	167 A	167 A	2
LXP-LB-US 10K Hybrid	439 A ⁽²⁾	210 A	210 A	3
LXP-US-12K Hybrid	516 A ⁽³⁾	250 A	250 A	3

⁽¹⁾ Calculated based on surge power of 2Pn for less than 0.5 seconds and charge/discharge efficiency of 93% as published in ECO Hybrid Inverter SNA-US 6000 User Manual (Version: SNA-EN-UM-1.0-AA, PN: 092.20016AA).

⁽²⁾ Calculated based on the surge power of 2Pn for 0.5 seconds and battery charge/discharge efficiency of 95% as published in HYBRID INVERTER 8-10K US User Manual (Version: EN-UM-1.0-AA, PN: 092.20013AA).

⁽³⁾ Calculated based on the surge power of 2Pn for 0.5 seconds and CEC efficiency of 96.9% as published in HYBRID INVERTER 12K US User Manual (Version: EN-UM-1.0-AA, PN: 092.20004AA).

⁽⁴⁾ Discover AES RACKMOUNT 48-48-5120/48-48-5120-H Battery, Peak Power (3 seconds): 218 A RMS, 95 A DC Continuous Charge/Discharge (1 hour), as published in Discover AES RACKMOUNT Installation and Operation Manual (805-0043 Rev F).

4. LYNK II CAN HARDWARE TERMINATION AND CAN OUT PIN CONFIGURATION

4.1 LYNK II CAN Termination

NOTICE
EQUIPMENT DAMAGE Disconnect power and all connections to LYNK II before attempting to configure header jumpers. Failure to follow these instructions may result in equipment damage.

Jumpers are used to configure termination for AEBus and LYNK Network, and the CAN Out pin assignments. Follow the [LYNK II Installation and Operation Manual](#) (805-0033) to learn how to access and configure the header board with jumpers.

Detailed pin configurations are included in the LYNK II User Manual but are repeated here for convenience.

NOTE

LYNK II terminates the AEBus and LYNK Network by default. Do not remove the termination jumper inside LYNK II unless instructed to do so by Discover Energy Systems.

4.2 LYNK II CAN Out - RJ45 PIN Assignments for Luxpower Inverters

CAN signals (CAN H, CAN L, CAN GND) can be assigned to any pin of the RJ45 connector by adjusting the jumpers on the header board.

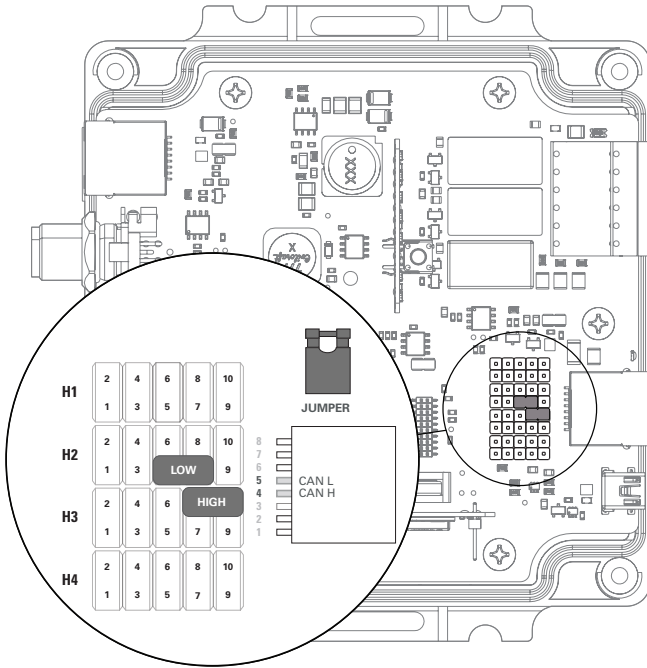


Figure 2. Luxpower CAN pin assignment

CAN Out	Header Jumper	RJ45 Pin
CAN L	H2 - 5 - 7	5
CAN H	H3 - 8 - 10	4
CAN GND	N/A	N/A

5. INSTALLING AND CONNECTING LYNK II TO THE LUXPOWER NETWORK

5.1 Networking Discover Lithium Batteries with LYNK II

NOTICE

EQUIPMENT DAMAGE

- Turn OFF all devices before connecting cables.
- Do not plug an AEBus RJ45 network cable or terminator into the 10/100 Ethernet port of the LYNK II.
- Do not connect a RJ45 twisted pair cable from the AEBus, LYNK, or Ethernet ports of the LYNK II to a WAN or MODEM port of a network router.
- Mixing the LYNK Network with other networks may result in equipment malfunction and damage.

Failure to follow these instructions may result in equipment damage.

NOTE

Unless Discover Energy Systems specifies, power electronics must not be connected directly to the LYNK or AEBus network.

Refer to the [LYNK II Installation and Operation Manual](#) (805-0033) for instructions on network layouts, connections, and terminations for compatible Discover Lithium battery models. Some key reminders are repeated here for convenience.

- At least one battery must be connected to the LYNK Port or AEBus Port on LYNK II.
- A network of batteries will communicate as one battery.
- No more than one network of batteries may be connected to LYNK II.
- Network termination is required for the system's proper functioning - note some batteries and devices may auto-terminate.
- LYNK II requires power from one of three possible sources: a 13-90 VDC power supply, AEBus Port or LYNK Port-enabled Discover Lithium battery, or a USB device.
- Discover Lithium batteries must be set to ON to supply power and communicate data with LYNK II.

AES RACKMOUNT

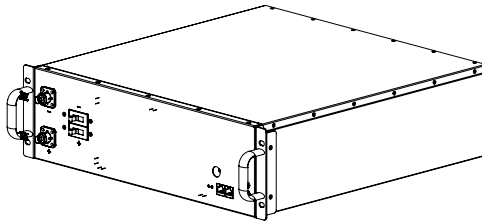


Figure 3. AES RACKMOUNT Battery Module

Both LYNK II and AES RACKMOUNT Battery Modules are internally terminated. No extra termination is required.

5.2 Connecting LYNK II to the Luxpower Network

Before connecting LYNK II to the Luxpower network, confirm that the CAN out pins on the LYNK II are configured correctly. Refer to [4. LYNK II CAN HARDWARE TERMINATION AND CAN OUT PIN CONFIGURATION](#).

Insert one end of a CAT5e or higher communication cable into the LYNK II CAN out port and the other end into the correct CAN port of the Luxpower inverter.

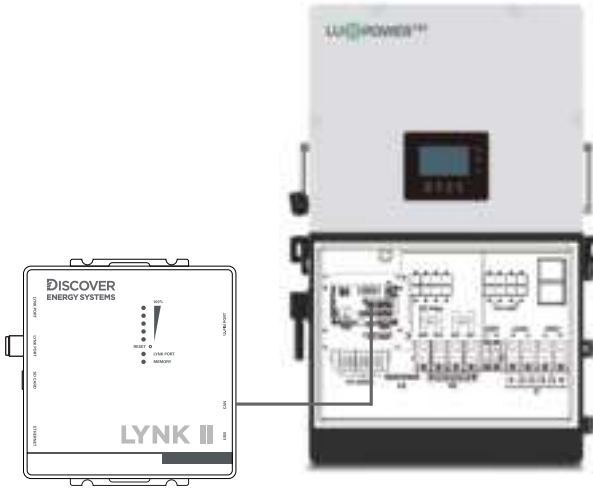


Figure 4. Luxpower CANopen Connection

6. ENABLING LYNK II TO COMMUNICATE WITH LUXPOWER DEVICES

When properly connected to a closed-loop network and set to use the Luxpower protocol, LYNK II will transmit real-time parameters from the Discover Lithium battery, including voltage, current, temperature, state of charge, and fault conditions to a Luxpower inverter. LYNK II will also transmit charge voltage and current requests from the Discover Lithium battery to a Luxpower inverter.

LYNK ACCESS software for 64-bit Windows 10 / 11 is required to configure LYNK II settings for closed-loop CAN communication with Luxpower inverters.

When the Luxpower inverter is configured in a closed loop with Discover Lithium batteries and the communication breaks between the LYNK II and inverter, after about a minute, the inverter safely stops operation and displays an alarm. If communication is re-established, the Luxpower inverter resumes closed-loop operation within seconds. However, if communication cannot be reestablished and you need to resume operation, you may have to manually convert the Luxpower inverter to an open-loop configuration. Refer to [A.1 Luxpower Open-Loop Configuration](#).

6.1 Luxpower Closed-Loop Configuration

6.1.1 Setting the LYNK II Communication Protocol for Luxpower

Set the LYNK II communication protocol and configure closed loop on the Luxpower inverter.

LYNK II Communication Protocol

1. Download the current version of LYNK ACCESS software from the Discover Energy Systems website to obtain the most up-to-date suite of available protocol configurations.
2. Using a USB cable with a Type-B mini-plug, connect the 64-bit Windows 10 / 11 device running LYNK ACCESS software to the USB port on LYNK II. Confirm LYNK II is powered and connected to the correct Luxpower COM port. Refer to [Figure 4. Luxpower CANOpen Connection](#).

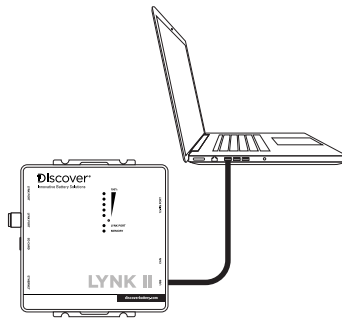


Figure 5. Configuring LYNK II with LYNK ACCESS Software

Ensure that you only have one LYNK device connected to the computer.

3. Open LYNK ACCESS and select the LYNK tab. Select the blue gear icon in the upper right area of the CAN Settings tile.
4. Select the pre-configured Luxpower protocol to complete the closed-loop configuration for LYNK II.
5. Click SAVE to confirm the configuration.

NOTE

Saving configuration changes in LYNK ACCESS will automatically cause LYNK II to shut down and restart.

6.1.2 Setting Closed-Loop Configuration on the Luxpower Inverter

After selecting the Luxpower communication protocol for the LYNK II, complete the closed-loop configuration on the Luxpower inverter. Confirm the Discover Lithium batteries are networked with LYNK II and that the LYNK II is connected to the Luxpower CAN port.

NOTE

- If using multiple inverters, configure Luxpower inverters to operate in parallel before setting the battery operation parameters.
- When connecting communication cables for multiple Luxpower inverters that operate in parallel, set the CAN communication pins to ON for the first and last inverters. For details on connecting multiple inverters in parallel, refer to the inverter manual.

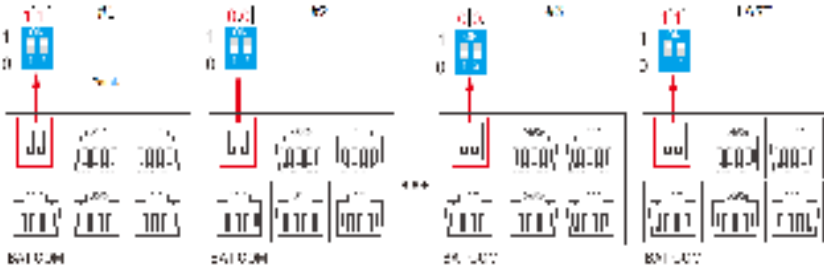


Figure 6. Pin Settings for Multiple Luxpower Inverters

Refer to the latest Discover Energy Systems documentation for battery values and the latest Luxpower documentation for menu navigation and details on the setup procedure.

1. Set the Discover Lithium batteries to ON and set the inverter to ON.
2. Using the inverter touch screen interface, touch the  Gear icon to set the properties as indicated in the following tables.
3. Touch the  Up and  Down buttons to scroll through screens.
4. Touch the  Set button to save changes on a screen.

NOTE

Depending on your system and particular use case, there may be other settings that require configuration. Refer to the inverter manual for information on these settings.

 > Advanced



Figure 7. Advanced - Screen 1



Figure 8. Advanced - Screen 2

Advanced (Screen 2)	
Battery Type	Select 2: Lithium.
Lithium brand	Select Lithium_2.

Touch the  Up and  Down buttons to scroll through screens. Touch the  Set button to save changes.

 > Charge



Figure 9. Charge - Screen 1

Charge - Screen 1	AES RACKMOUNT 48-48-5120 / 48-48-5120-H
Operating Mode	Select the Use SOC % check box.
Bat charge current limit (A)	95 A x number of batteries

Touch the  Up and  Down buttons to scroll through screens. Touch the  Set button to save changes.

 > Discharge



Figure 10. Discharge - Screen 1

Charge - Screen 1	AES RACKMOUNT 48-48-5120 / 48-48-5120-H
Operating Mode	Select the Use SOC % check box.
Discharge current limit (A)	95 A x number of batteries
On-grid cut-off (%)	The recommended value is 10% or more.
Off-grid cut-off (%)	

Touch the  Up and  Down buttons to scroll through screens. Touch the  Set button to save changes.

APPENDIX

A.1 Luxpower Open-Loop Configuration

Refer to the latest Discover Energy Systems documentation for battery values and the latest Luxpower documentation for menu navigation and details on the setup procedure.

NOTE

Depending on your system and particular use case, there may be other settings that require configuration. Refer to the inverter manual for information on these settings.

1.

Set the Discover Lithium batteries to ON and set the inverter to ON.

2.

Using the inverter touch screen interface, touch the  Gear icon to set the properties as indicated in the following tables.

3.

Touch the  Up and  Down buttons to scroll through screens.

4.

Touch the  Set button to save changes on a screen.

 > Advanced



Figure 11. Advanced - Screen 2

Advanced (Screen 2)	AES RACKMOUNT 48-48-5120 / 48-48-5120-H
Battery Type	Select 1: Lead-acid when operating the inverter and Lithium batteries in an open-loop configuration.
Lithium brand	100 A x number of batteries

Touch the  Up and  Down buttons to scroll through screens.Touch the  Set button to save changes.

> Charge



Figure 12. Charge - Screen 1

Charge - Screen 1	AES RACKMOUNT 48-48-5120 / 48-48-5120-H
Operating Mode	Select Use Bat V when operating the inverter in an open-loop charge configuration.
Bat charge current limit (A)	95 A x number of batteries

Touch the  Up and  Down buttons to scroll through screens. Touch the  Set button to save changes.



Figure 13. Charge - Screen 1

Charge - Screen 1	AES RACKMOUNT 48-48-5120 / 48-48-5120-H
Absorb voltage (V)	55.2
Float voltage (V)	53.6
Start derate Volt (V)	48

Touch the  Up and  Down buttons to scroll through screens. Touch the  Set button to save changes.

 > Discharge



Figure 14. Discharge - Screen 1

Charge - Screen 1	AES RACKMOUNT 48-48-5120 / 48-48-5120-H
Operating Mode	Select Use Bat when operating the inverter in an open-loop charge configuration.
Discharge current limit (A)	95 A x number of batteries
On-grid Cut-off (V)	Set to voltage greater than the Start derate Volt. The recommended value for the cut-off is 48.5 V or more.
Off-grid Cut-off (V)	

Touch the  Up and  Down buttons to scroll through screens. Touch the  Set button to save changes.